IN THE SPECIFICATION:

On page 3 please replace Paragraph [0008] with the following amended paragraph [0008]:

[0008] Optimum bond parameters for a bond force F_B and an ultrasonic variable P_B and, optionally, at least one further bond parameter G_B of a Wire Bonder for ball bonding can be determined in accordance with the invention by means of a method with the following steps:

Carrying out a number of bond cycles of n = 1 to k, whereby the bond force F_B and the ultrasonic variable P_B and, if necessary, the at least one further bond parameter G_B are each varied in discrete steps within a predetermined range whereby with each bond cycle a wire connection is made between a connection point of a semiconductor chip and a connection point of a substrate in that a wire end protruding out of a capillary is melted into a ball and then, in a first bond position, the wire ball is attached to the connection point of the semiconductor chip, the wire is then pulled through to the required length, formed into a wire loop and, in the second bond position, attached to the connection point of the substrate, and whereby, for each bond cycle n, after attaching the wire ball to the connection point of the semiconductor chip, the following steps are carried out:

a) Application of a predetermined bond force F_{B1},
b) Movement of the capillary out of the bond position in a predetermined horizontal direction whereby the current $I_{B,n}$ flowing through the drive that moves the capillary is monitored,
c) Stopping the movement of the capillary as soon as the current $I_{B,n}$ decreases,
d) Determining the maximum of the current $I_{B,n,max}$ ($F_{B,n}$, $P_{B,n}$, $G_{B,n}$) from the progression of the current $I_{B,n}$ ($F_{B,n}$, $P_{B,n}$, $G_{B,n}$, t) established during steps b) and c) whereby the variables $F_{B,n}$, $P_{B,n}$ and $G_{B,n}$ are the values for bond force F_B, the ultrasonic variable P_B and, if necessary, the at least one further bond parameter G_B set for bond cycle n and the time is designated with parameter t,
e) Moving the capillary to the bond position,
f) Attaching the wire ball to the connection point of the semiconductor chip,

and whereby, from the values $I_{B,n,max}$ ($F_{B,n}$, P_n, G_n) established with the n bond cycles, those values for the bond force F_B, the ultrasonic variable P_B and the if necessary at

least one further bond parameter G_B are determined as optimum bond parameters for which the current $I_{B,n,max}$ ($F_{B,n}$, P_n, G_n) reaches a maximum. For this determining, if need be, the customary methods of statistics such as interpolation, for example, can be used.

On page 3 please replace Paragraph [0011] with the following amended paragraph [0011]:

[0011] Optimum bond parameters for the bond force F_W, the ultrasonic variable P_W and, optionally, the at least one further bond parameter G_W of a Wire Bonder for wedge bonding can be determined by means of an analogous method which assumes other values for the parameters F_W, P_W and, if necessary G_W and with which, for each bond cycle n, after attaching the wire to the connection point on the substrate, the following steps are carried out:

a) Applying a predetermine bond force F_{W1},
b) Movement of the capillary out of the bond position in a predetermined horizontal direction whereby the current $I_{W,n}$ flowing through the drive that moves the capillary is monitored,
c) Stopping the movement of the capillary as soon as the current $I_{W,n}$ decreases,
d) Determining the maximum of the current $I_{W,n,max}$ ($F_{W,n}$, $P_{W,n}$, $G_{W,n}$) from the progression of the current $I_{W,n}$ ($F_{W,n}$, $P_{W,n}$, $G_{W,n}$, t), established during steps b) and c) whereby the variables $F_{W,n}$, $P_{W,n}$ and $G_{W,n}$ are the values for bond force F_W, the ultrasonic variable P_W and, if necessary, the at least one further bond parameter G_W set for bond cycle n,
e) Moving the capillary to the bond position,
f) Attaching the wire to the connection point of the substrate,

and from the values $I_{W,n,max}$ ($F_{W,n}$, $P_{W,n}$, $G_{W,n}$) established with the n bond cycles, those values for the bond force F_W, the ultrasonic variable P_W and the if necessary at least one further bond parameter G_W are determined as optimum bond parameters for which the current $I_{W,n,max}$ ($F_{W,n}$, $P_{W,n}$, $G_{W,n}$) reaches a maximum.

On page 5 please replace Paragraph [0016] with the following amend d paragraph [0016]:

[0016] The invention can be used as described for determining optimum bond parameters. The optimum bond parameters F_1, P_1, G_1 for the bond force F, the ultrasonic variable P and further bond parameters G are determined before production operation is started. (Because the number of further bond parameters G is generally greater than 1, the designation G_1 stands for a corresponding number of values.) However, in a modified form, the invention additionally enables the in situ monitoring of the bond quality during production operation. To do so, the shear strength of selected bond connections is tested immediately after they have been made in that the capillary is used in order to shear off the bond connection, whereby the maximum of the current flowing through the drive of the capillary is determined. Afterwards, a second bonding process is carried out in order that the ball or wedge detached during the test can be re-attached to the connection point. During bonding, the formed ball or wedge is deformed, in particular pressed flat. When the bond connection is made, separated and made again, then the resulting ball or wedge is too flat and the danger exists that the tested bond connection no longer achieves the required bond quality. For this reason, on making the first bond connection, bond parameters are used which result in a weaker bond connection and which less strongly deform the ball or wedge. The making, shearing off and renewed making of the bond connection therefore take place in accordance with the following process steps:

- Making a bond connection on a connection point with predefined values F_2, P_2, G_2 for the bond force F, the ultrasonic variable P and further bond parameters G, whereby at least one of the values F_2, P_2, G_2 is less than the corresponding value F_1, P_1, G_1.
- Carrying out the test for quality control according to the following steps:
  a) Application of a predetermined bond force F_3,
  b) Movement of the capillary out of the bond position in a predetermined direction whereby the current $I_n(t)$ flowing through the drive which moves the capillary is monitored over the course of time t,
  c) Stopping the movement of the capillary as soon as the current I(t) decreases,

d) Determining the maximum current I_{max} from the progression of the current I(t) established during steps b) and c);

and

- Making the bond connection on the connection point with the values F_1, P_1, G_1.

On page 6, please replace the sub-title prior to Paragraph [0023] with the following:

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

On page 7 please replace Paragraph [0025] with the following amended paragraph [0025]:

[0025] To determine the optimum bond parameters for the bond force F, an ultrasonic variable P and, optionally, at least one further bond parameter G of a Wire Bonder for ball bonding as well as for wedge bonding, a number of n = 1 to k bond cycles are carried out, whereby the bond force F_B or F_W, the ultrasonic variable P_B or P_W and, if necessary, the at least one further bond parameter G_B or G_W are each varied in discrete steps within a predetermined range. With each bond cycle n, after attachment of the wire ball 3 to the connection point 4 of the semiconductor chip 5, ie, after step B and before step C, the following steps are carried out:

B.a) Application of a predetermined bond force F_{B1},

B.b) Movement of the capillary 1 out of the bond position in a predetermined horizontal direction whereby the current $I_{B,n}(t)$ flowing through the drive which moves the capillary 1 is monitored (t represents time),

B.c) Stopping the movement of the capillary 1 as soon as the current $I_{B,n}(t)$ decreases,

B.d) Determining the maximum of the current $I_{B,n,max}$ ($F_{B,n}$, $P_{B,n}$, $G_{B,n}$) from the time progression of the current $I_{B,n}(t)$ established during steps b) and c) whereby the variables $F_{B,n}$, $P_{B,n}$ and $G_{B,n}$ are the values for bond force F_B, the ultrasonic variable P_B and, if necessary, the at least one further bond parameter G_B set for bond cycle n,

B.e) Moving the capillary 1 to the bond position,

B.f) Attaching the wire ball 3 to the connection point 4 of the semiconductor chip 5.

On page 8 please replace Paragraph [0030] with the following amended paragraph [0030]:

[0030] Analogously, after attaching the wire 2 to the connection point 8 of the substrate 9, ie, after step E and before step F, the following steps are carried out:

E.a) Application of a predetermined bond force F_{W2},

E.b) Movement of the capillary 1 out of the bond position in a predetermined horizontal direction whereby the current $I_{W,n}(t)$ flowing through the drive which moves the capillary 1 is monitored,

E.c) Stopping the movement of the capillary 1 as soon as the current $I_{W,n}(t)$ decreases,

E.d) Determining the maximum of the current $I_{W,n,max}$ ($F_{W,n}$, $P_{W,n}$, $G_{W,n}$) from the progression of the current $I_{W,n}(t)$ established during steps b) and c), whereby the variables $F_{W,n}$, $P_{W,n}$ and $G_{W,n}$ are the values for bond force F_W, the ultrasonic variable P_W and, if necessary, the at least one further bond parameter G_W set for bond cycle n,

E.e) Moving the capillary 1 to the bond position,

E.f) Attaching the wire 2 to the connection point 8 of the substrate 9.

On page 9 please replace Paragraph [0032] with the following amended paragraph [0032]:

[0032] Fig. 3B shows the situation during step E.b. The not presented horn, at the tip of which the capillary 1 is clamped, is moved in a horizontal direction or rotated on a vertical axis. At the same time, the current I is monitored which flows through the drive which moves or rotates the horn. In doing so, the tip of the capillary 1 presses against the wire 2 attached as a wedge 10 to the connection point 8 of the substrate 9 which hinders the capillary 1 and therefore also the horn from carrying out the desired movement. The force exerted by the capillary 1 onto the wedge 10 in horizontal direction increases continually until finally the wedge 10 detaches itself from the connection point 8. The capillary 1 can now follow the movement of the horn so that the current flowing through the drive quickly decreases whereupon the

movement of the capillary 1 in step E.c is immediately stopped. This situation is shown in Fig. 3C. Later, in step E.e, the capillary 1 is brought back into the bond position and, in step E.f, the wedge 10 is again attached to the connection point 8 of the substrate 9.